

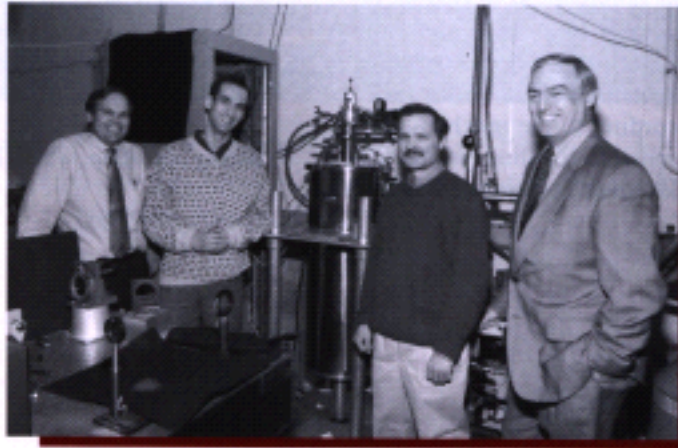
Quantitative Mobility Spectrum Analysis (QMSA) for Evaluating Semiconductor Electronics Materials

The Quantitative Mobility Spectrum Analysis (QMSA) is a new method, developed by the NRL team, that characterizes the fundamental electrical properties of layered semiconductor structures. From electrical measurements as a function of a magnetic field, QMSA can simultaneously determine the properties of as many as ten different charge carriers in a complex multilayered structure. These properties are directly related to the performance of semiconductor-based devices, such as high-speed computer circuits, making QMSA a valuable new tool for research and development, diagnostics, and quality control in the areas of semiconductor manufacture and research.

NRL worked with the University of Western Australia to develop the QMSA, constructing its software architecture into a commercially

marketable package. Once the technology was commercially viable, the lab then identified Lake Shore Cryotronics, Inc. (LSCI), a developer and international supplier of technology for property measurement and process control, as an excellent commercial partner. NRL and LSCI signed a Cooperative Research and Development Agreement (CRADA), as well as a licensing agreement. Under the patent license, LSCI is selling QMSA as a software product.

By using QMSA to monitor materials in near real-time, manufacturers can increase product quality and decrease the number of wafers that fail to meet specifications, leading to an overall reduction in cost. The semiconductor chip industry is intensely competitive; thus, any cost savings are especially important to profit margins.



*From left: Dr. Craig A. Hoffman, Dr. Igor Vurgaftman,
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